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A METHOD OF DETERMINING DENSITY OF LOBLOLLY PINE STANDS

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The evaluation of the density of stocking of even-aged stands is of considerable importance in the determination of yield, the prediction of growth, and the comparison of stands. Lacking better means, foresters have computed density as the ratio of either the volume, basal area, or number of trees per acre for a given stand of known age and site to corresponding values in normal yield tables. A new method recently developed ^{1/} allows the evaluation of density of stocking by referencing the number of trees per acre growing in a stand of known average diameter to the number which would be present if the stand were densely stocked.

This technical note presents a table showing the number of trees per acre which occur in densely stocked stands of loblolly pine having different average diameters. The figures presented do not necessarily represent the number of trees which an area should support to give best growth or maximum yield, but instead are presented for use as base values to which other stands may be referenced. It is proposed that values presented in the attached table be considered as representing 100% stocking until further investigations provide

^{1/} Reineke, L. H. Perfecting a stand-density index for even-aged forests.
Jour. Agr. Research, Vol. 46, p. 627-637, 1933.

a sound basis for changing them. These tabular values were derived from a re-analysis of the field data collected by the Southern Forest Experiment Station as representing fully stocked stands for use in the preparation of normal yield and stand tables for loblolly pine ^{2/}.

In using the table to determine the density of a given stand only the average diameter of the stand and the number of trees per acre over 1.0 inches in diameter need be determined. The number of trees which represent 100% stocking for the given average diameter is then read from the table and the density of the stand determined by dividing the actual number of trees by the number necessary for 100% stocking. The following example illustrates the procedure:

Given, a stand:	No. of trees per acre	= 500
	Average D.B.H.o.b. (from average basal area)	= 6.4 inches

Number of trees per acre for a 100% Stocked stand with average diameter of 6.4 inches (read from table)	= 607
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Density of given stand = 500 divided by 607 = 82%

^{2/} U.S.D.A. Volume, Yield, and Stand Tables for Second-Growth Southern Pines.
U.S.D.A. Misc. Pub. 50, September, 1929.

Number of Trees Necessary for 100% Stocking
in Loblolly Pine Stands of Different Average Diameters

<u>1/</u> Average D.B.H. o.b.	<u>2/</u> Base No. of trees per acre	<u>1/</u> Average D.B.H. o.b.	<u>2/</u> Base No. of trees per acre	<u>1/</u> Average D.B.H. o.b.	<u>2/</u> Base No. of trees per acre	<u>1/</u> Average D.B.H. o.b.	<u>2/</u> Base No. of trees per acre
1.0	14,420	6.0	677	11.0	240	16.0	127
1.2	10,560	6.2	641	11.2	233	16.2	124
1.4	8,121	6.4	607	11.4	226	16.4	121
1.6	6,466	6.6	575	11.6	220	16.6	119
1.8	5,285	6.8	547	11.8	214	16.8	117
2.0	4,416	7.0	520	12.0	207	17.0	115
2.2	3,753	7.2	496	12.2	201	17.2	113
2.4	3,235	7.4	475	12.4	196	17.4	110
2.6	2,821	7.6	452	12.6	191	17.6	108
2.8	2,488	7.8	433	12.8	186	17.8	106
3.0	2,211	8.0	414	13.0	181	18.0	104
3.2	1,981	8.2	397	13.2	176	18.2	102
3.4	1,788	8.4	381	13.4	172	18.4	100
3.6	1,621	8.6	366	13.6	168	18.6	98
3.8	1,475	8.8	352	13.8	164	18.8	96
4.0	1,353	9.0	339	14.0	160	19.0	94
4.2	1,245	9.2	326	14.2	156	19.2	93
4.4	1,151	9.4	314	14.4	152	19.4	91
4.6	1,064	9.6	303	14.6	148	19.6	90
4.8	990	9.8	293	14.8	145	19.8	89
5.0	924	10.0	283	15.0	142	20.0	87
5.2	864	10.2	274	15.2	139	20.2	86
5.4	812	10.4	265	15.4	136	20.4	84
5.6	762	10.6	256	15.6	133	20.6	83
5.8	718	10.8	248	15.8	130	20.8	82
						21.0	80

1/ . Average D.B.H.o.b. is the diameter breast high outside bark for the tree of average basal area.

2/ . These values were obtained from the regression equation

Logarithm of number of trees per acre = -1.707 logarithm of average D.B.H.o.b. of the stand + 4.1588 ; for which the correlation coefficient is $.9625$, and the standard error of estimate is $\pm .0862$ in logarithmic units, or $\pm 17.2\%$.